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Assessing the True Value of Spectrum

By Thomas Kidd - January-March 2015

There is little argument that the electromagnetic spectrum is valuable: A few megahertz can sell for billions of dollars at auction. However, the true value of spectrum is in how it is used.

For example, we are all familiar with WiFi or wireless broadband. Our cellular phones and other connected devices have become critical to our modern lifestyles. Most would agree that the value of this spectrum usage is extremely high. These are just a few of the many devices that depend on spectrum to operate.

Additional examples include radar that is used to track aircraft and the weather. Telemetry systems relay equipment test and experimental data. And Land Mobile Radio provides our law enforcement and first responders with critical communications capabilities. These devices can be called "active" systems, other systems are "passive" in nature, such as passive receivers that listen to spectrum but do not transmit, providing value without introducing additional energy into the electromagnetic environment.

Some passive systems are used for scientific research such as for an environmental study or radio astronomy. The value of the electromagnetic spectrum as used by these passive systems is incalculable. Such spectrum usage enables monitoring solar weather, which could impact the global electric grid. These passive spectrum systems also advance general knowledge by expanding our understanding of our place in the universe. Passive systems often use exceptionally sensitive receivers, which are very difficult to protect from electromagnetic interference and are uniquely vulnerable to the electromagnetic energy transmitted by other users.

Electromagnetic spectrum has long been critical to our nation's security and economy. The Department of the Navy Chief Information Officer addressed this issue in a video (available at <http://www.doncio.navy.mil/ContentView.aspx?id=441>). As technological advancements lead to greater use of electromagnetic spectrum, its value to both our national defense and our nation's economy continues to increase. The amount of spectrum available is limited only by users' abilities to coexist and share access with other spectrum users. Fortunately, continual advances in technology create increasing opportunities for sharing.

Electromagnetic spectrum management policies have evolved during the course of the last 100 years through a series of economic and political events. Federal spectrum regulators are responsible for protecting public (government/military) interests while offering opportunities for profit to the private sector (wireless providers). Maintaining the proper balance between private spectrum ownership and public spectrum access is a continuous challenge.

This challenge involves the responsibility of federal spectrum users to protect mission requirements and operate spectrum-dependent systems in a specific frequency band while also considering the potential to supplement their federal appropriations with money received from spectrum auctions. Operational concerns, limited resources, and perceived spectrum inefficiencies are all issues agencies address as they weigh the pros and cons of selling spectrum.

Finding balance between private ownership and public access has never been easy. Determining how a specific band of electromagnetic spectrum provides the greatest value must include consideration for the greater public interest. The benefits of public spectrum are critical to electromagnetic spectrum policy debate. The public good of electromagnetic spectrum has long been recognized. The opportunity to provide private spectrum ownership has only recently been explored in the United States. Given the lure of auction returns for private access, we must assure that the interests of public use requirements are receiving appropriate attention.

Future spectrum users will continue to strive for more efficient spectrum-dependent systems. Greater effort will be made to preserve and protect the electromagnetic environment. And spectrum auctions will be based on spectrum utility. Policymakers will continue to learn from the lessons of the past and proceed with caution to assure they are safeguarding future public spectrum interests and the electromagnetic spectrum itself.

The future of spectrum involves both sharing this valuable resource and protecting the fragile

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environment. The true value of spectrum is often many times more than the price it will bring at auction.

Thomas P. Kidd III, is the Lead for Strategic Spectrum Policy in the Department of the Navy.

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